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April 29, 1993

Ms. Donna R. Searcy, Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

RECEIVED

APR 30 1993

EGE - FCC Meeting

April 29, 1993

- **FCC Refarming of Spectrum Below 512 MHz**
  - **Viability of Migration Plan**
  - **Spectrum Efficiency Issues**
  - **Flexibility of Spectrum Management Policies**
  - **Flexibility of Technical Rules**

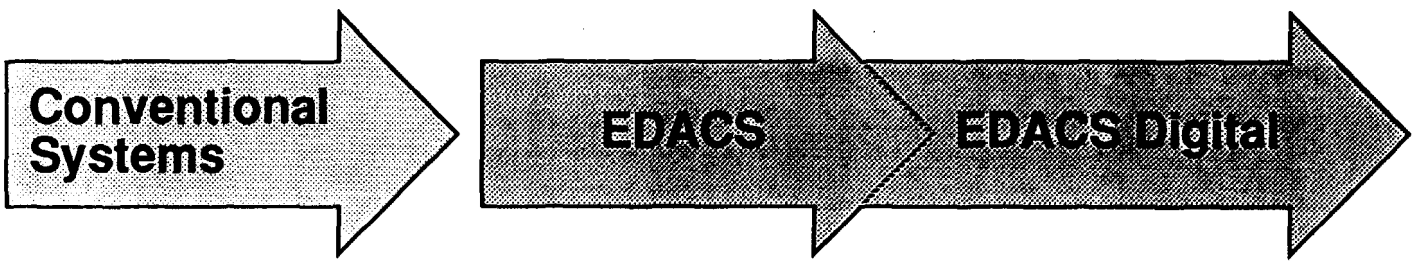
Who Is Ericsson GE ?

We are a joint venture between two global communications

What is EDACS

EDACS is our Enhanced Digital Access Communication System

- Advanced Digital Trunked Communications System
- Frequency Band Independent (150 MHz - 900 MHz)
- Designed for maximum:
  - Reliability
  - Efficiency
  - Flexibility
  - Expansion capability
- EDACS is also our platform for future digital systems



How Does EDACS Meet Your Requirements

EDACS is designed with features which make it a system an entire Organization such as a City, County or Utility can rely on.

EDACS uses frequencies more efficiently than current technology	**Efficiency**	An entire Organizations's communication needs can be served by EDACS
Users can be segmented into independent, autonomous groups	**Value**	All Operating Groups can share a single EDACS network
EDACS constantly monitors and adjusts itself without human intervention	**Reliability**	The system will perform without constant attention
EDACS is designed to "heal" itself if parts of the system become damaged	**Durability**	EDACS is designed to continue operating even under catastrophic conditions
Advanced, high speed digital design allows features not available in other systems	**Flexibility**	EDACS offers integration of advanced features: voice, data, status, messaging
The EDACS architecture and structure is very simple and modular	**Longevity**	The EDACS design can be expanded and upgraded to accomodate change

Spectrum Management - EGE Position

- **EGE Positions Regarding Spectrum Refarming:**
  - **EGE supports the concept of improving spectrum management through Channel Transparent digital technologies**
    - **Minimize migration burden on users**
    - **Prevents wholesale obsoletion of existing investment**
  - **Encourage, establish & mandate progressive levels of *Spectrum Efficiency* based on emerging spectrum efficient technologies**
    - **Implement & grant Exclusive Use Licenses based on conversion to Spectrum Efficient technologies**
    - **Centralized Trunking (encourage immediately)**
    - **Spectrum efficient digital technologies with Channel Transparent migration**
  - **Do not *preclude* fair & full competition by restrictive *mandatory* policies in setting any *Technical or Interoperability* standards**
    - **Set spectrum efficiency standard with challenging timetable**
    - **Permit flexibility in application of technology to achieve spectrum efficiency**
  - **Encourage *wide choice* of technology for users**
    - **Create spectrum *bands* by user class**
    - **Permit flexibility for creation of contiguous Wideband channels ("stacking")**

Refarming
Key Points for EGEMC/FCC

EGE is FOR:

- **Simplification of Pt. 90 Rules**
- **Mandate of Spectrum Efficiency Improvements ("FCC should mandate Efficiency, not Technology")**
- **Flexibility in Application of Technology to Achieve Efficiency**
- **Creating Spectrum "Bands" per User Class**
- **Allowing Channel "Stacking" (Contiguous)**

Refarming
Key Points for EGEMC/FCC

EGE is AGAINST:

- **Very Narrow Band "Benchmark Technology" mandate by FCC (on basis of unproven technology)**
- **New Allocation of any adjacent narrowband channel that is co-sited with a channel "in-migration"**
- **Interleaving of User Classes in Allocation of Channels**
- **NPRM's Schedule of Implementation**
  - **VNB @ R&O (New Allocations)**
  - **NB @ 1996 (All Channels)**
  - **VNB @ 2004 (All Channel Phase-In by Market)**
- **Mandated Migration where no Spectrum Shortages Exist**

EGE Position on Trunking

- **Migration to trunking in all frequency bands must be first step towards increased *Spectrum Efficiency* in the use of PLMR spectrum**
  - **Extend Trunking to VHF (150-174 MHz) and to UHF (450-512 MHz) on existing channel plans**
  - **Establish economic and regulatory incentives such as exclusive use licenses to encourage migration**
  - **Permit interconnection of similar agencies on State Wide or Nation Wide basis via wide area licenses**
  - **Establish reasonable but challenging timetable for Trunking migration**
  - **Validate *Channel Transparent* migration to increased spectrum efficiency**

Advantages of Trunking

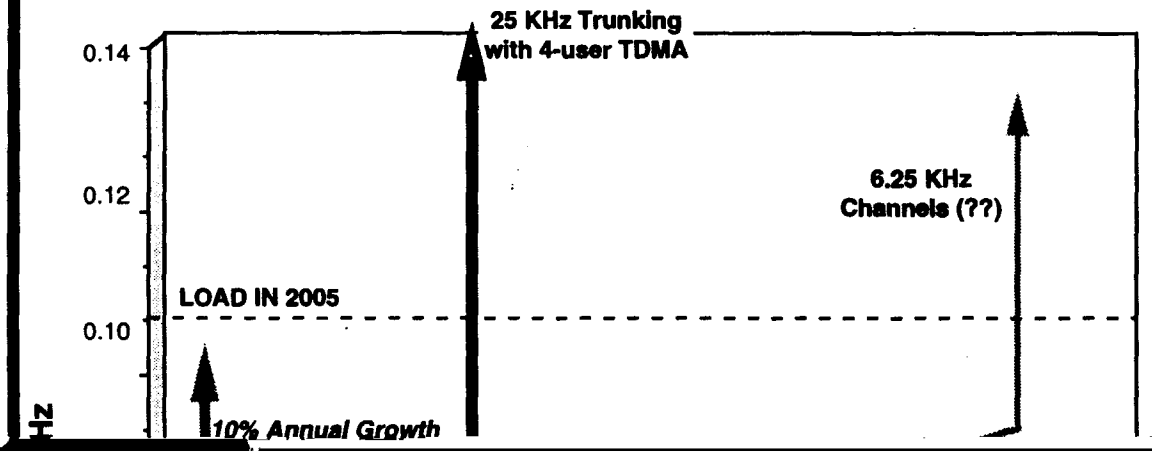
- One System for Multiple Departments or agencies
- Virtual Privacy for Individual User Groups
- Shared Channels for most efficient throughput
- Eliminates Co-channel Interference from Other Users
- Increased Spectral Efficiency
- Higher Degree of Integration of System Services (Voice, Data)

Barriers to Trunking

- Allocation of Frequencies & licenses
- Lack of Regulatory or Economic Incentives
- User Concern With System Resilience & Security
- User Perceptions of Availability of Technology

Spectrum Management Decisions & Consequences

Erlangs/KHz vs. Users/25 KHz of Spectrum

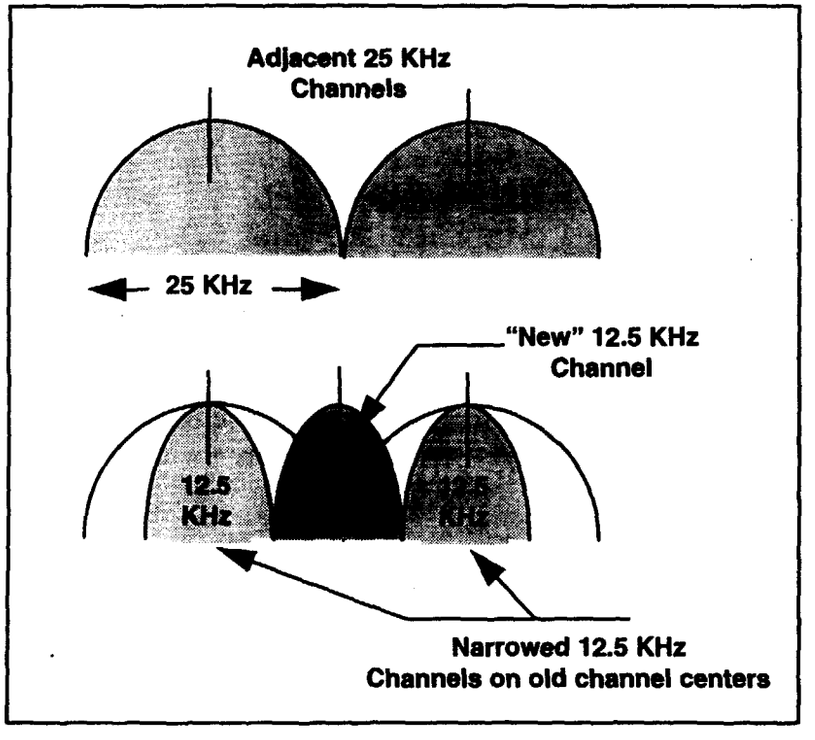


TRUNKING & TDMA **are flexible alternatives for spectrum management vs.**

Spectrum Efficiency

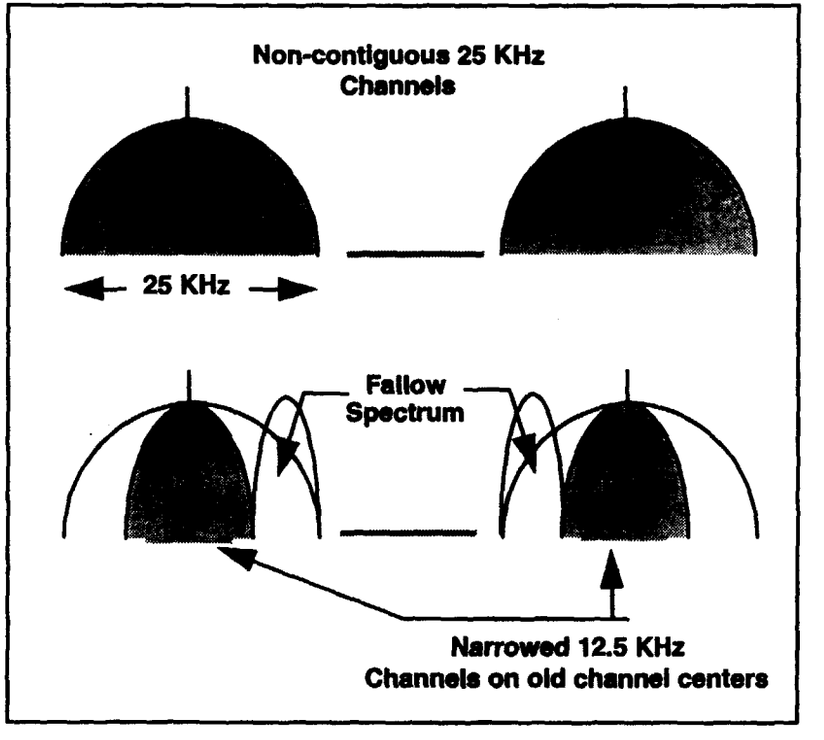
Does 25 kHz to 12.5 kHz Channel Splitting Yield a True 2:1 Gain ? NO !

Case 1: Contiguous 25 kHz Allocations



FDMA GAIN = 3 For 2 OR 50%

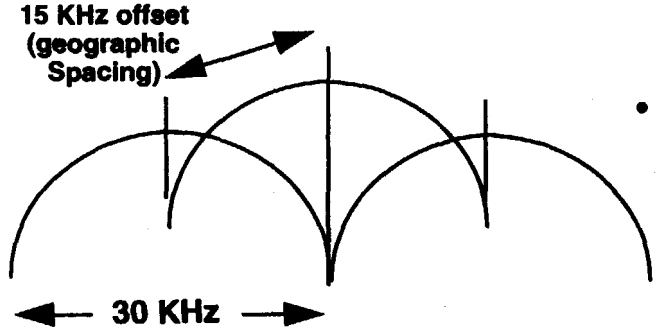
Case 2: Non-Contiguous 25 kHz Allocations



FDMA GAIN = 2 For 2 OR 0%

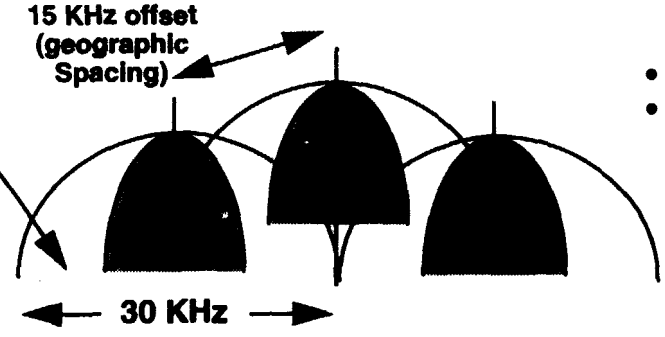
150 - 170 MHz: Gain From 12.5 KHz

TODAY



- 275 Channels Today

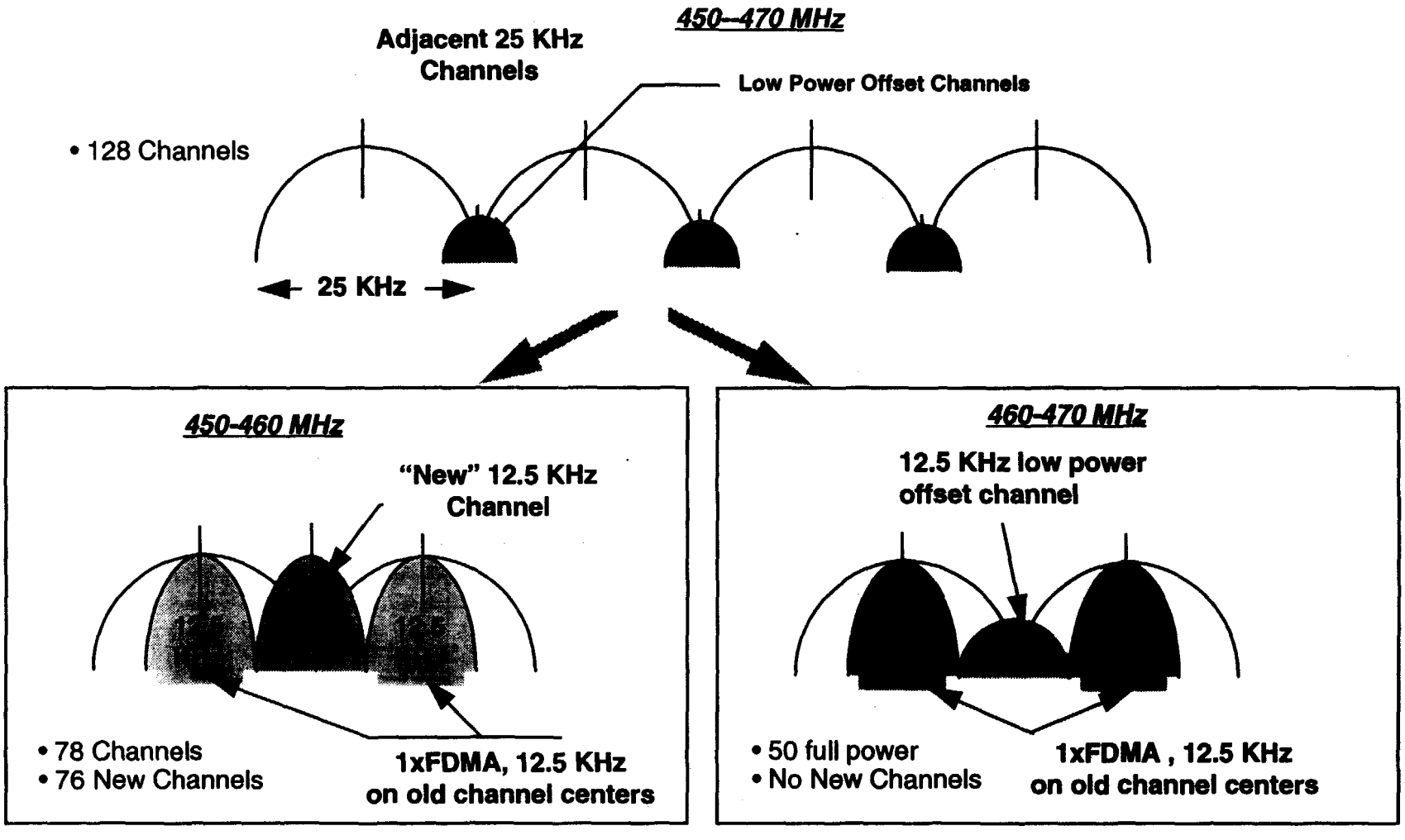
AFTER 12.5 KHz SPLIT



- 275 Channels after 12.5 KHz split
- NO New Channels

Net Gain In Channels at 150 - 170 MHz is *0%*

APCO Proposal for 450-470 MHz



Gain in Spectrum Efficiency is Less Than 60%

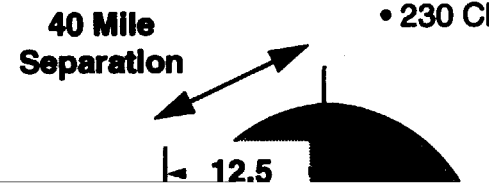
800 MHz Migration Options With 12.5 KHz FDMA

806-821 MHz

- 70 Channels Today

821-824 MHz (NPSPAC)

- 230 Channels Today



Public Safety Spectrum

NOW

Frequency Band	Current PS Channels
150-174 MHz	275
421-512 MHz	128
806-824 MHz	299
Total	702

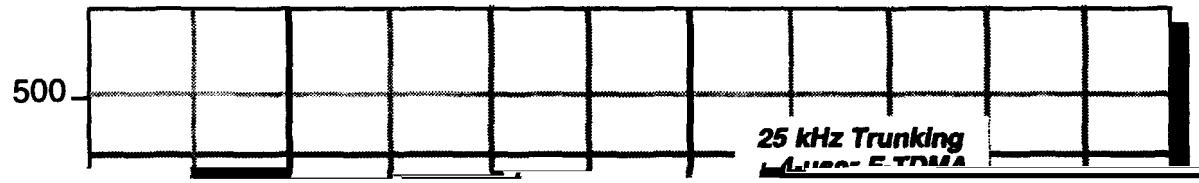
AFTER 12.5 kHz FDMA

Frequency Band	Current PS Channels	Channels Created by FDMA	% Change
150-174 MHz	275	0	0%
421-512 MHz	128	76	60%
806-824 MHz	299	45	15%
Total	702	121	17%

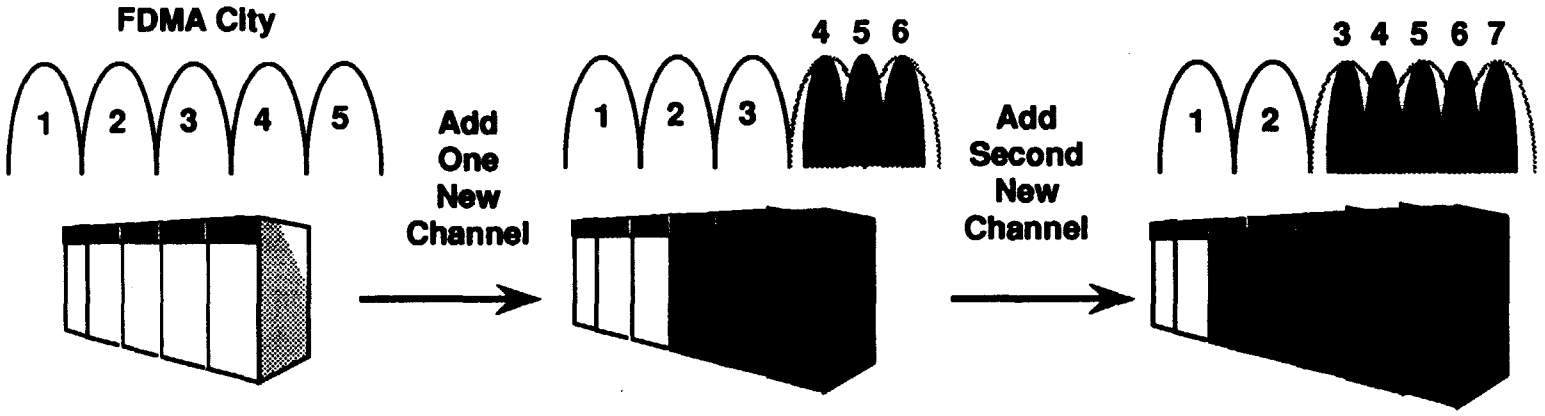
12.5 kHz FDMA Yields Insufficient Capacity in 3-5 Years

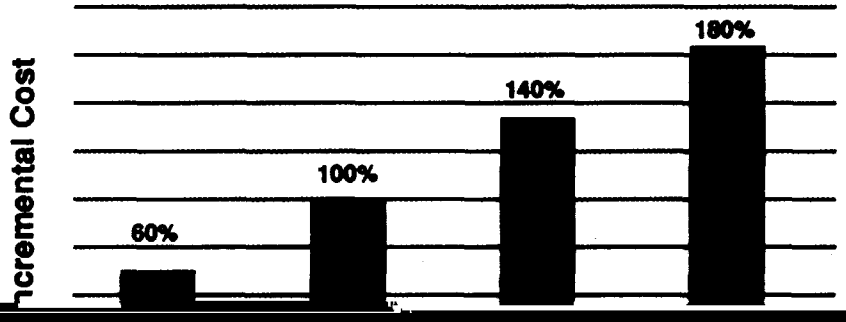
Spectrum Demand vs. Spectrum Management

F-TDMA Gains Spectrum Efficiency *Without* Successive Re-Channelization



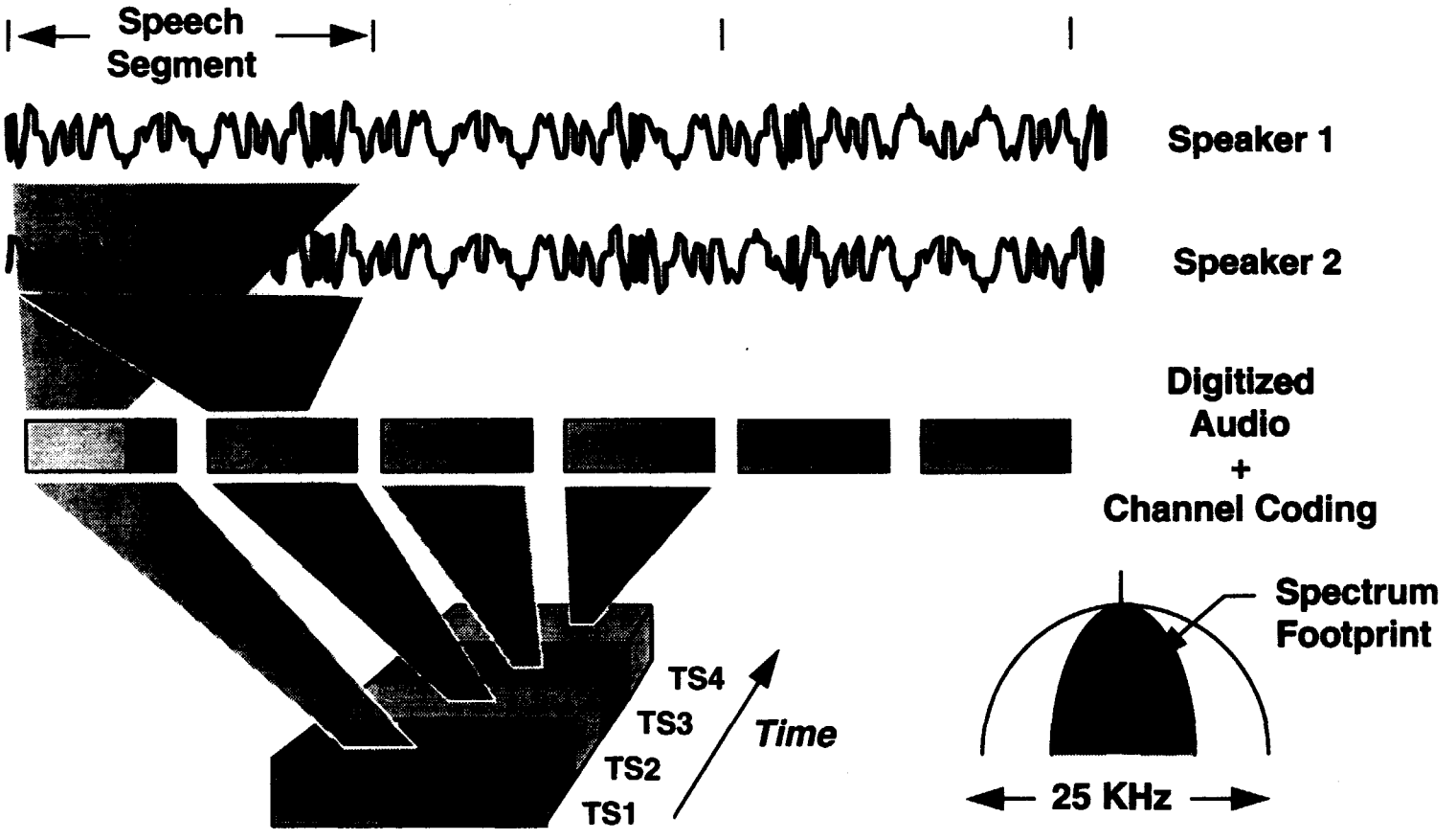
FDMA Economics





20% Spectral Efficiency Gain at a Cost Increase

TDMA - How Does It Work ?



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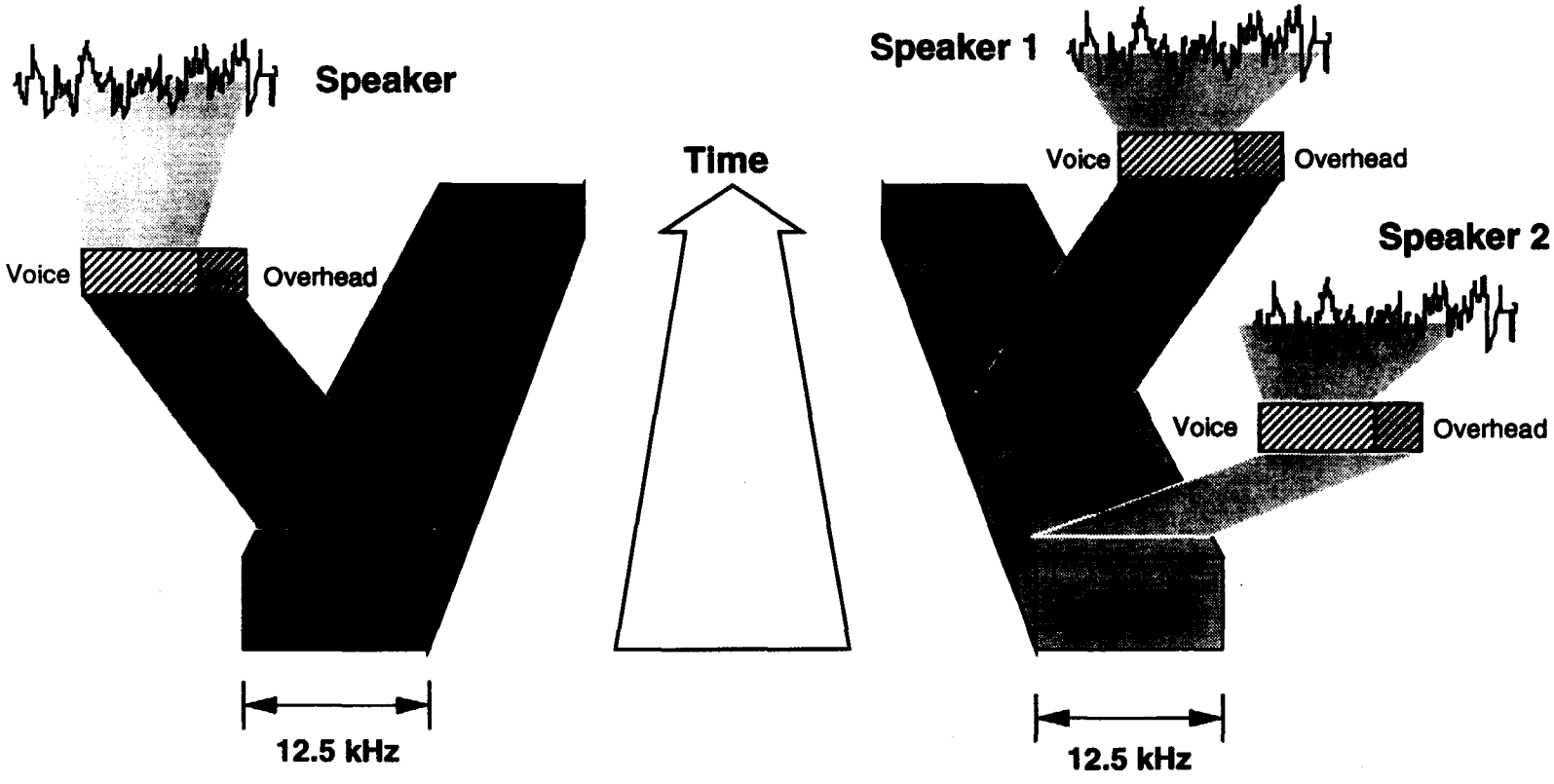
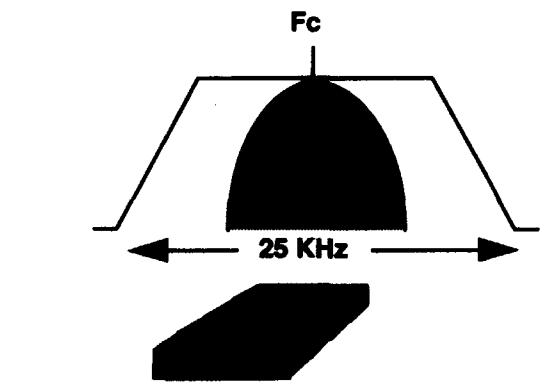
FDMA vs F-TDMA



FDMA Provides 1 User in 12.5 kHz

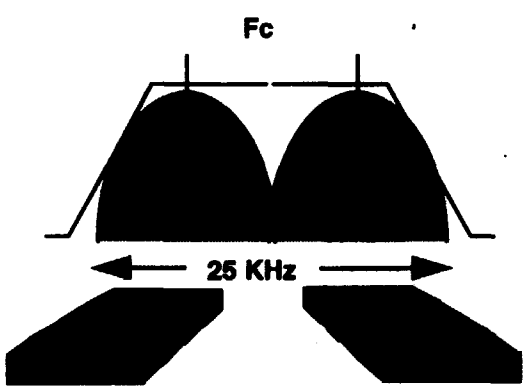
F-TDMA Provides 2 Users in 12.5 kHz

F-TDMA: Migration



Phase 1

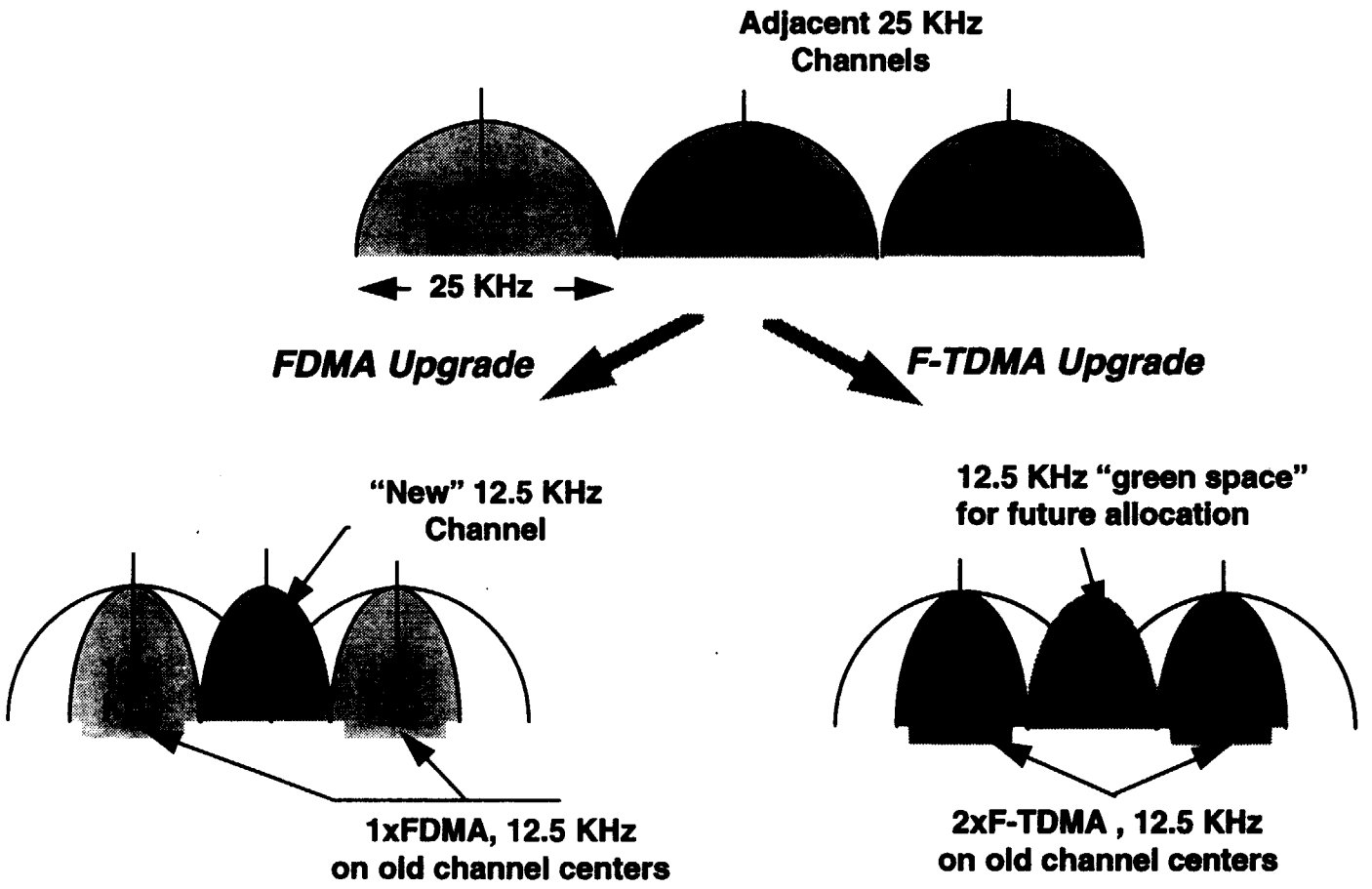
- 2 x F-TDMA
- 12.5 KHz & 25 KHz Channels



Phase 2

- 2 x F-TDMA, 12.5 KHz Channels
- 4 x F-TDMA, 25 KHz Channels

Migration Options: *FDMA vs F-TDMA*



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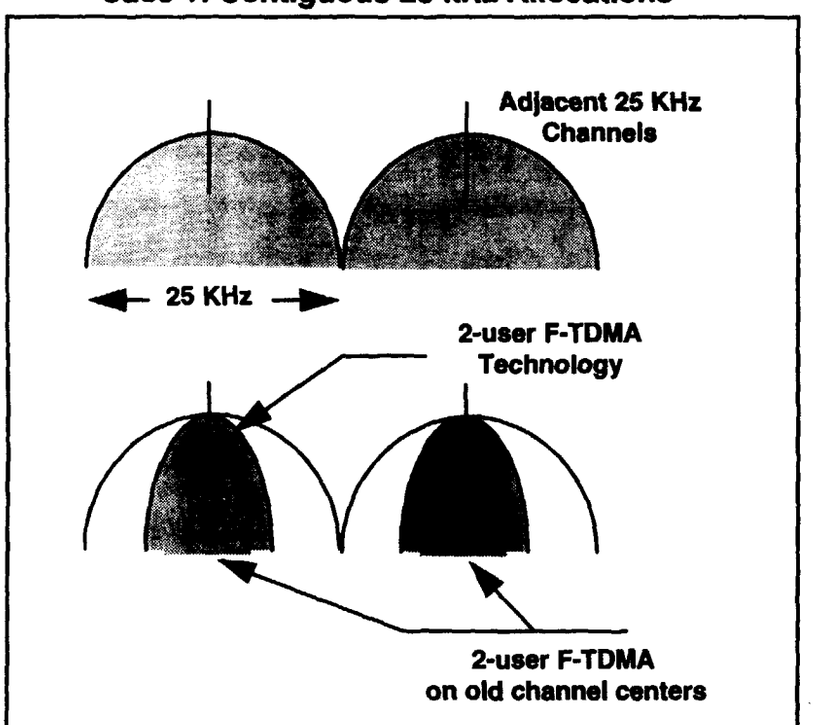
Spectrum Efficiency

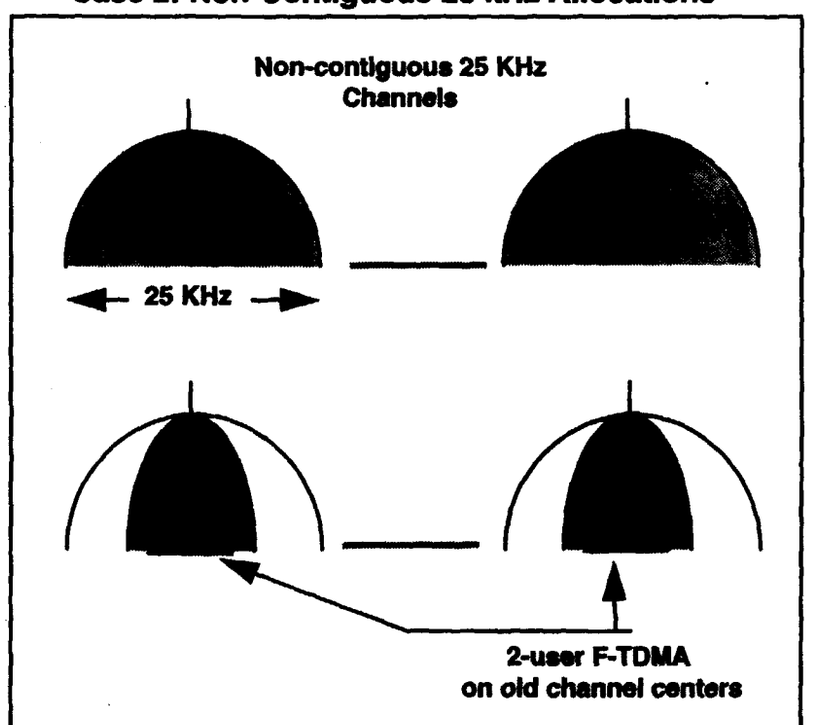
Does F-TDMA on 25 kHz OR 12.5 kHz Yield a True 2:1 Gain ? YES !

Case 1: Contiguous 25 kHz Allocations



F-TDMA GAIN = 4 For 2 OR 100%

Case 2: Non-Contiguous 25 kHz Allocations



F-TDMA GAIN = 4 For 2 OR 100%

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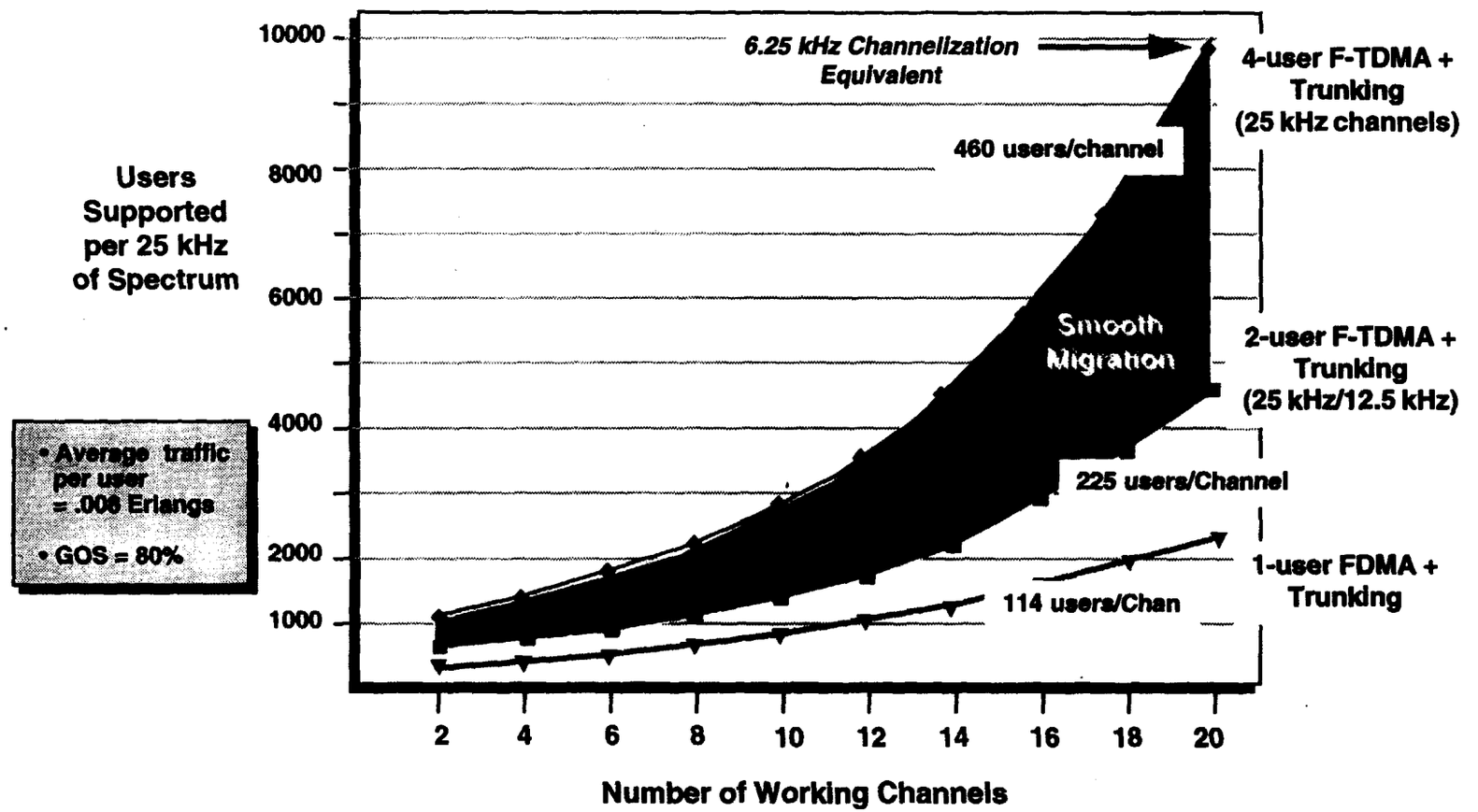
F-TDMA: Smooth Capacity Migration



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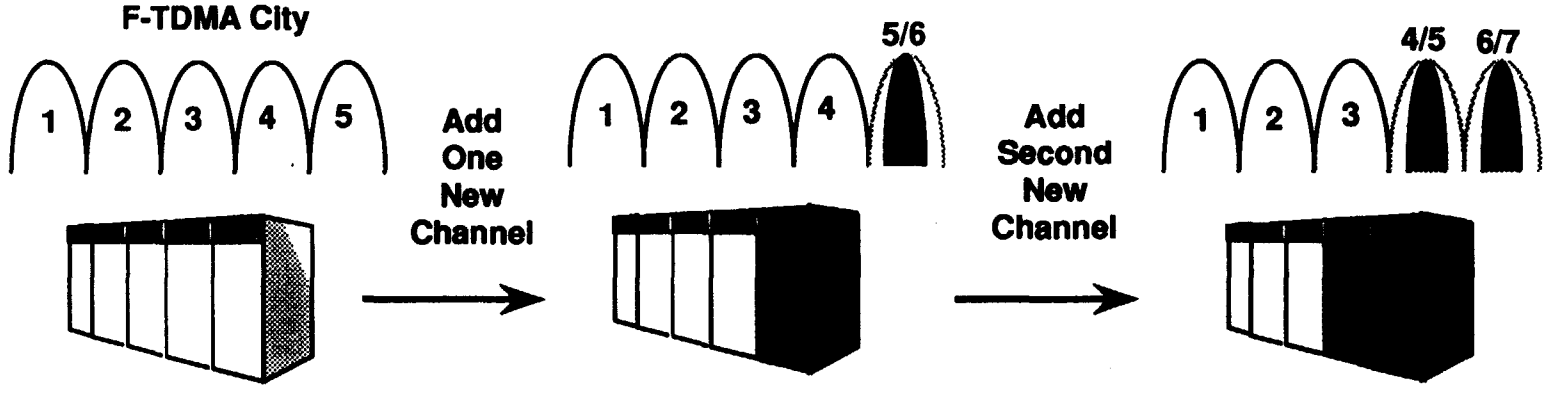
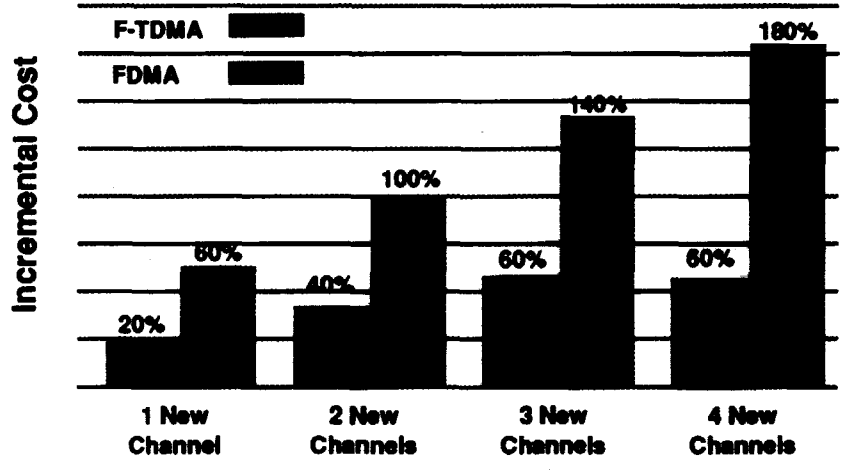
F-TDMA Economics





F-TDMA is Significantly More Cost Effective

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